

Robert W. Gillespie, P.E.
Consulting Geotechnical Engineer

Registered in: Montana Wyoming North Dakota South Dakota Idaho Nevada
Maine New Hampshire Massachusetts Vermont Florida

27 December 1994

Ms. Pat Potts
Dept. of Health and Environmental Sciences
Solid and Hazardous Waste Bureau
P.O. Box 200901
Helena, MT 59620-0901

Subject: Addendum to Site Characterization
Mister M Landfill, License No. 302
Lewistown, Montana
Project No. 579-03

RECEIVED

JAN 05 1995

Montana Department of Health
and Environmental Sciences
Waste Management Division

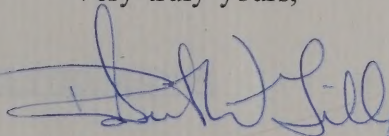
Dear Ms. Potts:

In accordance with our discussions regarding additional subsurface and water quality data, we present this addendum as evidence of acquisition of the requested data. Briefly, two additional ground water monitoring wells were installed at locations selected in our meeting, and three additional monitoring wells which can serve for both methane and ground water were installed at locations along the perimeter of the landfill. Water quality samples were obtained from the office well, the Mintyala residence well, and MW-10 which is the only monitoring well to encounter ground water, albeit in small quantities.

Logs and completion forms for the wells are attached as are revised boring location plans and cross-sections. Evaluation of the previous and additional data substantiate Mister M Disposal, Inc.'s request for a no migration petition under the solid waste regulations. We have made recommendation for semi-annual monitoring of MW-10 and the office well; tests should include EPA 624 compounds.

We look forward to a favorable response based on our last communications with you, and if you have any questions of if we may be of further service, please contact us.

Very truly yours,



Robert W. Gillespie, P.E.



RWG:pg
In duplicate
cc: Mister M Disposal, Inc.

INTRODUCTION

The purpose of the additional work and evaluations described herein was to resolve several issues surrounding the geohydrologic characterization of the Mister M Landfill Site in Lewistown, Montana. DHES had requested that certain wells be sampled and tested for the water quality parameters contained in Table 1 of ARM 16.14.706, and that two additional monitoring wells be installed at locations side and down gradient of the landfill. As actually performed, the work scope was as follows:

1. Drill, log, and sample two monitoring wells at the locations shown on Figure 2 (Revised) which is attached for your reference.
2. Install monitoring wells in each boring in general accordance with standard practices, and develop them if ground water was present. In addition three methane monitoring wells were installed as shown on Figure 2. The data obtained from these borings were used wherever possible in the evaluation of the overall landfill setting.
3. Locate the wells horizontally and vertically using NGVD datum.
4. Purge and sample the office and house wells, and any monitoring well containing ground water. In this case, MW-10 has small quantities and it was sampled after development. Purging and sampling were performed in accordance with EPA protocols, and samples were delivered to Energy Labs in Billings within 24 hours of actual recovery. Wells external to the site were not sampled due to lack of land owner permission for trespass.
5. Test the recovered ground water samples for those constituents contained in Table 1 of ARM 16.14.706, plus several others no longer contained in the table but having pertinence with respect to definition of landfill leachate and identification of its influences on ground water.
6. Evaluate all acquired field, office and laboratory data to refine and further substantiate the "no migration" petition for the Mister M Landfill.
7. Prepare an addendum to the Report of Geohydrologic site Characterization.

INVESTIGATIONS

Field

Two monitoring wells were drilled at the locations shown on Figure 2 attached. The wells were drilled with a top drive, air rotary rig using a 6 5/8 inch drag bit. The borings were observed and logged by our senior geotechnical engineer using the procedures recommended

Robert W. Gillespie, P.E.

by the Unified soil Classification System. Grab samples from the discharge were obtained at frequent intervals and classified for particle size, composition, and moisture content. MW-9 was drilled due east of MW-1 and 8, and south of the office well. The bore was taken to a depth of 62 feet which is slightly more than requested by your office. MW-10 was drilled southwest of MW-2 and 7 to a depth of 61 feet. Again, this is slightly deeper than requested. Monitoring wells were installed in each boring using 2 inch diameter flush coupled pvc pipe. Boring logs and monitoring well completion reports are presented in Appendices A and B respectively.

Three methane monitoring wells were installed at the locations shown on Figure 2. MW-5M and 6M were installed in close proximity to the original wells but with a significantly enlarged screen interval. Lithologies were similar to the original bores and were useful for confirmation. MW-11M is located north of the office and current borrow area. It was placed there to provide monitoring between the landfill and the existing residence. While it did not encounter ground water over its 105 feet of depth, its lithology provides additional substantiation of geotechnical conditions in the vicinity of the landfill.

Ground water samples were obtained from the office and house wells, and MW-10. The office and house wells were run for approximately 60 minutes prior to sampling at the tap; sampling at the tap was selected because there no water treatment systems in place. MW-10 was sampled using a sterile bailer. It was not purged prior to sampling because of the very slow recovery experienced during development following installation. We were concerned that insufficient water would return to the well in a reasonable time. Samples were chilled to 2° to 4°C shortly after sampling, and delivered to Energy Labs in Billings the same day.

Laboratory

The ground water samples were tested for the parameters listed in Table 1 of ARM 16.14.706 plus TDS, calcium, potassium, magnesium, total hardness, total alkalinity, ammonia as NH₄, copper, and dichlorodifluoromethane, also known as freon. The laboratory results are presented in Appendix C and include the QA/QC data of the laboratory.

FINDINGS AND EVALUATIONS

The additional monitoring wells confirm the stratigraphy of our earlier presentations. The inclusion of MW-11M also supports the presentation of Fall River Sandstone overlying Kootenai sediments with a gray to dark gray shale at the contact. The bentonite layer encountered in MW-2 and 7 earlier is repeated in MW-10. The distinct bentonite zone appears to transition to an intercalation of shale and bentonite as it extends southward through MW-9. The stratigraphy of MW-11M also shows shale/bentonite mixtures at a depth which is consistent with bedding angles measured during the first field program. Subsurface profiles A-A', B-B', and C-C' which were included in the revised submittal have been modified because we now have actual topography for the landfill site. The cross-sections were replotted

at equal horizontal and vertical scales to remove the awkwardness created by earlier vertical scale exaggerations. Profiles A-A' and C-C' were also modified to include the new monitoring wells.

MW-10 encountered ground water in a thin sandstone seam at a depth of 53 to 55 feet. The seam is overlain by a thick layer of bentonite and underlain by clay shale of the Kootenai Formation. When contacted during drilling, the "show" or yield was only enough to provide approximately 5 gallons of water until the bore was completed. During development after monitoring well completion, the yield was also small and recovery was time consuming. Extrapolation of the sandstone seam up, down, and side gradient does not yield any matching stratigraphies nor any zones of possible recharge. During work in the Wyoming coal fields we frequently encountered small isolated pockets of sandstone or scoria which held extremely limited aquifers. A number of them were pumped dry during construction dewatering or for access to coal seams. The seam exhibits a slight excess head of about 10 feet but does not correlate with any other developed or acquired data.

Water quality results indicate that ground water is neutral to slightly alkaline in pH, is moderately hard to hard, and has relatively high iron contents. COD values are very low, and sulfate, calcium, potassium, chloride, and sodium are within ranges normal to the Kootenai Formation. With the exception of iron, metals are virtually non-existent. Several volatile organic compounds (voc's) were detected at very low concentrations in MW-10 and the office well. Table I below provides a summary of these findings.

TABLE I
SUMMARY OF VOC TEST RESULTS
Concentrations ppb

<u>Compound</u>	<u>Office Well</u>	<u>MW-10</u>	<u>MCL⁽¹⁾</u>	<u>LHA⁽²⁾</u>
cis-1,2 Dichloroethene	37	22	70	--
Dichlorodifluoromethane	21.1	1.9	--	1000
Vinyl Chloride	1.4	1.0	2	--
Benzene	--	1.2	5	--
Methylene Chloride	--	1.5	5	--

The concentrations are well below established standards and in part may be the result of well installations, and sample handling. Cis-1,2 dichloroethene is a soil fumigant which has been used for almost 40 years in agricultural areas. It is non-soluble in water and very stable, hence its popularity. Dichlorodifluoromethane is a refrigerant commonly referred under various trade names as "freon". Its presence in near surface soils is probable because of white goods handling and dismantling. Vinyl chloride, methylene chloride, and benzene are among the top ten chemicals produced in the world and are all solvents with various purposes. The very low levels of the first two suggest that they may have formed in the vials prior to delivery to the laboratory. That is, organic carbon and a chlorine compound exposed to ultraviolet light

produce these compounds in low concentrations. Chlorinated drinking water which has come in contact with an organic substance such as soil will produce the same effect. In summary, we suspect that the freon, soil fumigant and benzene were introduced into the well during drilling through upper level soil falling back into the bore, and air evacuated water flushing the sides of the bore.

In order to evaluate the validity of the sample suite from MW-10 and the office well, they were purged and sampled on 29 December 1994; extra care was taken to avoid exposure to sunlight. The samples were chilled and delivered to Energy Labs in Billings for testing by EPA 624 methodology. Results indicate that all previously detected compounds are now non-detect with the exception of cis-1,2 dichloroethene in the office well at a concentration of less than 1 ppb.

CONCLUSIONS AND RECOMMENDATIONS

ARM 16.14.714 states that ground water monitoring at a Facility may be waived if the facility demonstrates there is no potential for hazardous constituents to contaminate the uppermost aquifer. The demonstration must be based on:

16.14.714(2)(a) Site-specific field collected measurements, sampling, and analysis of physical, chemical, and biological processes affecting contaminant fate and transport; and

16.14.714(2)(b) Contaminant fate and transport predictions that maximize contaminant migration and consider impacts on human health and environment.

16.14.714(3) No-migration petitions must demonstrate that ground water will not become contaminated for at least thirty years after the entire facility is closed.

16.14.714(4) The department may deny any no-migration petition or variance if the department determines that insufficient data and studies exist to demonstrate no potential for migration of contaminants or leachate at a facility.

16.14.714(5) The department may require the installation of vadose zone monitoring devices, piezometers or saturated zone monitor wells as part of an ongoing no-migration demonstration.

We have demonstrated through laboratory and in situ testing that permeabilities are low and approach or exceed values commonly used for landfill liner and/or cap materials. It follows that recharge to ground water is severely reduced, and probably eliminated for practical purposes.

Since no ground water has been found in locations other than deep water supply wells overlain by 100+ feet of fine grained sedimentary rock, fate and transport modelling become

moot. Water balance evaluations are strongly suggestive of almost 100 percent consumption by run-off and evapotranspiration. Geologic mapping and publications indicate the sandstone aquifer used by the Mintyalas and surrounding land owners is recharged in the Judith Mountains to the north and east. We also note that the downgradient toe of the landfill is just above the stormwater pond, and that ditches collect run-off from the uphill flanks. Since sediments underlying the landfill are relatively impervious, any leachate would probably be transported to the pond. Assuming that leachate were available for transport, then the most probable path is south to southwest along the general path of the original drainage way. Ground water velocity can be estimated from the equation

$$V = \frac{Ki}{n}$$

where,

K is the permeability (L/T)

i is the gradient (L/L) and

n is the void ratio (L³/L³)

Substituting values of 1×10^{-6} cm/sec for K, 0.1 for i, and 0.3 for n yields a velocity of 3.3×10^{-7} cm/sec or 9.5×10^{-4} ft/yr. Therefore, in 30 years the leachate might move 10 to 100 feet. Both distances are well within the property boundaries.

The additional work supports our original conclusion that the site warrants issuance of a no migration petition. Geotechnical data support our original hypothesis that the landfill proper and its environs are underlain by more than 100 feet of material which have very low permeability and do not act as an aquifer in the standard sense. Although the ground water at MW-10 has no obvious or apparent connection with or to the landfill, the anomaly is deserving of continuing attention in light of the proximity of the landfill.

Based on our studies, finding, and evaluations we make the following recommendations.

1. Check all monitoring wells for ground water on a quarterly basis except MW-10 which should be checked on a monthly basis. The information should be entered into a data base such as Lotus, dBase etc., so that it can be manipulated for evaluation purposes with each new acquisition. If the ground water in MW-10 is isolated, the fluctuations should be small and relatively unaffected by precipitation events.

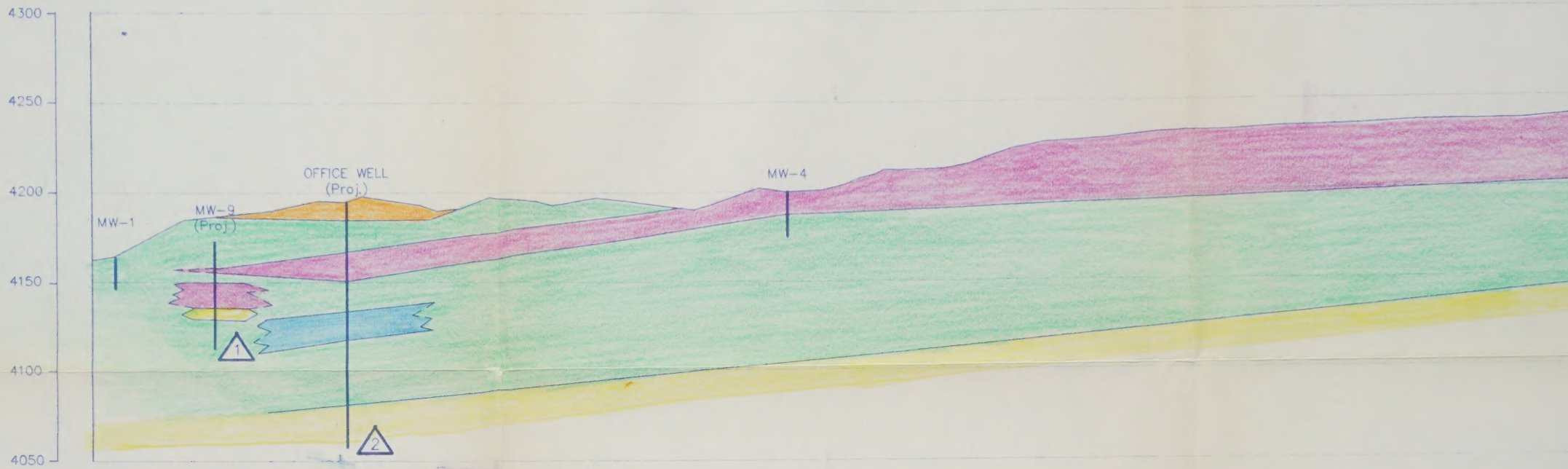
2. Sample MW-10 and the office well on a semi-annual basis and test for volatile organic compounds including dichlorodifluoromethane by EPA 624 methodology. The acquired data should be treated in the same manner as the ground water level data.

3. Sample surface water in the detention pond, if it exists, at the same time as ground water sampling. It should be tested for sulfate, pH, zinc, and COD as measures of leachate influence.

A'

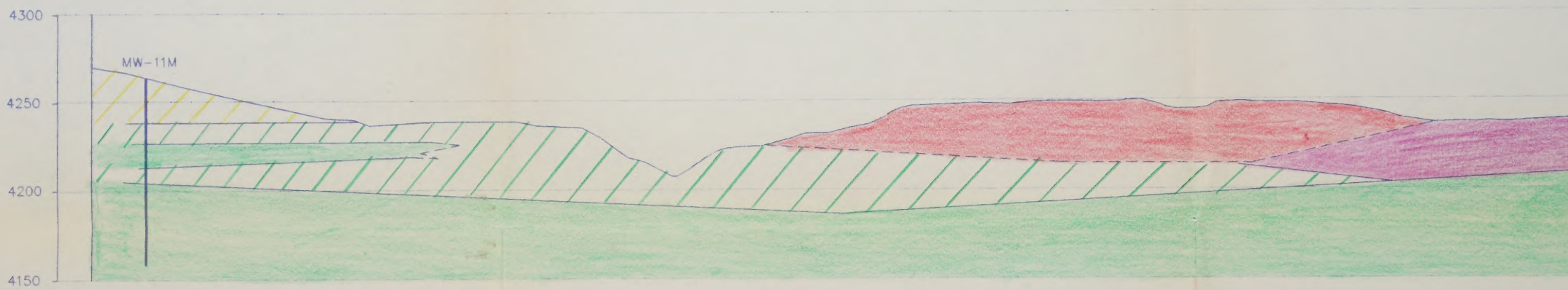
Figure A-1

ELEV.
FT. A



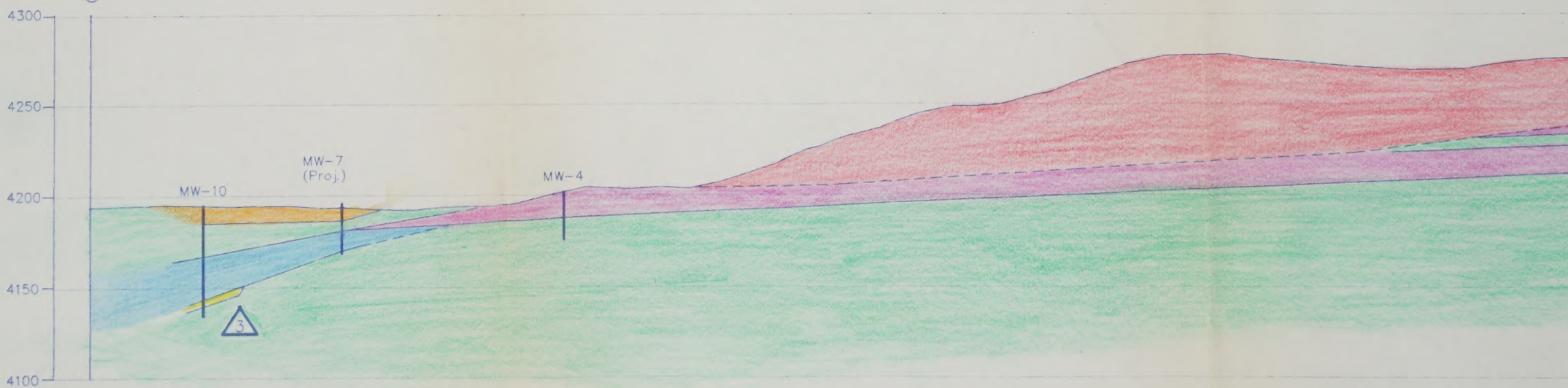
SUBSURFACE PROFILE A-A'
Horizontal and Vertical Scale 1" = 50'

ELEV.
FT. B



SUBSURFACE PROFILE B-B'
Horizontal and Vertical Scale 1" = 50'

ELEV.
FT. C



SUBSURFACE PROFILE C-C'
Horizontal and Vertical Scale 1" = 50'

Figure A-142

95-09

FACE PROFILE A-A'

and Vertical Scale 1" = 50'



LEGEND:



LANDFILL MATERIAL



FILL; soil (weathered shale)



SILTSTONE; fine to very fine, plastic when wet, tan to tan-gray



SHALE; bentonitic in zones, colorations of red, maroon



BENTONITE; white to shades of white with maroon, red, and gray



SANDSTONE; typically fine, some very fine, very silty zones, tan.



BENTONITIC SHALE



FALL RIVER SANDSTONE; silty sandstone, sandy siltstone, plastic, tan-gray

NOTES:



Shale is bentonitic and appears to be transitioning from bentonite to a shale



Water bearing zone for Office Well



Minor water bearing zone in MW-10



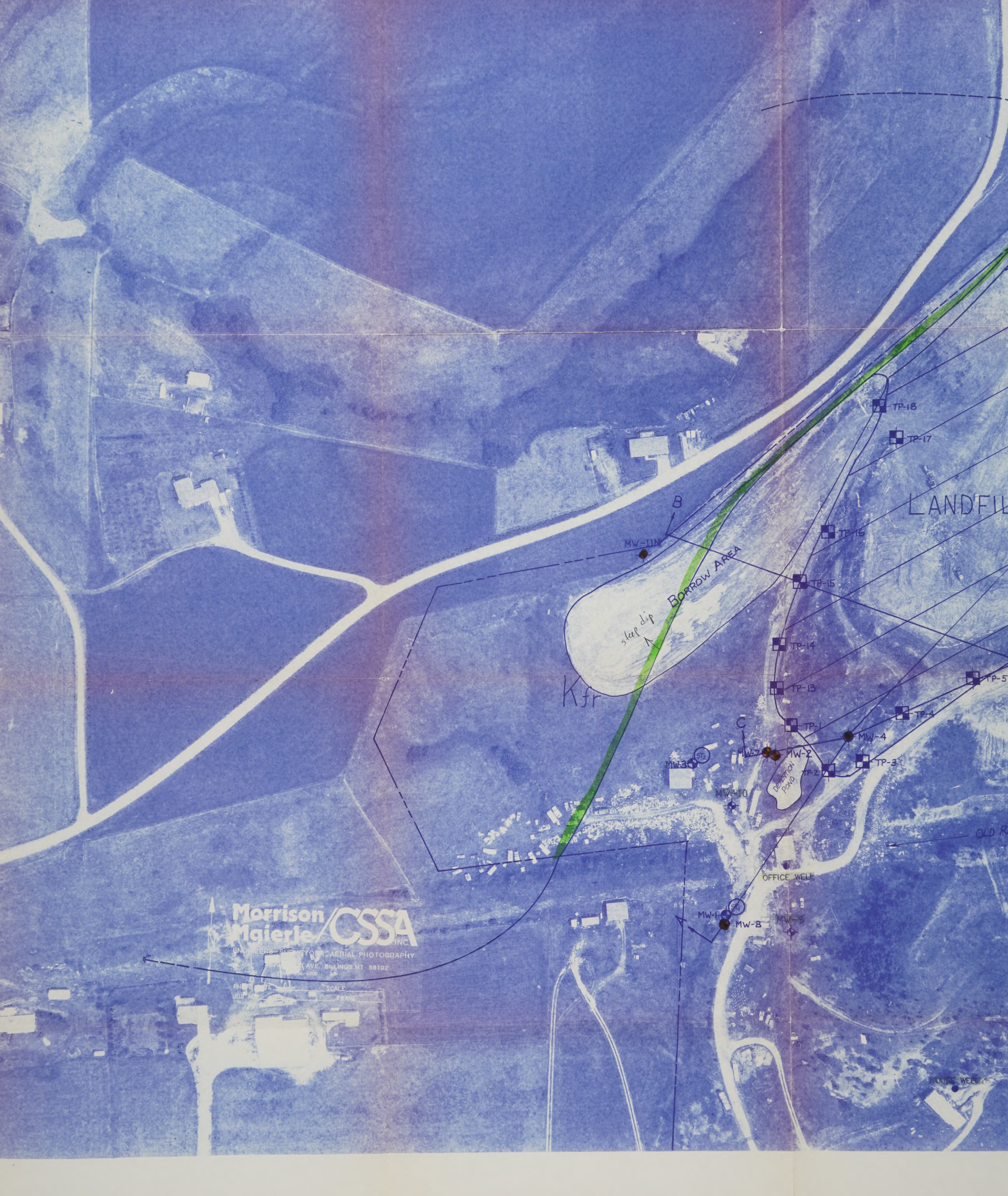
GEOLOGIC SUBSURFACE PROFILES
GEOHYDROLOGIC SITE CHARACTERIZATION
MISTER M LANDFILL
LEWISTOWN, MONTANA

DECEMBER 1994

PROJECT NO. 579-03

Robert W. Gillespie, P.E.
Consulting Geotechnical Engineer
P. O. Box 876
Lewistown, Montana 59457

FIGURE A-1



**Morrison
Mgierle / CSSA**
INC.
ENGINEERS SURVEYORS AERIAL PHOTOGRAPHY
1000 1ST AVE. BILLINGS MT 59102
406-600-6000

PHOTO DATE: 10/1/88
JOB NO: 1000
SCALE: 1" = 100'
FRAME: 1000

Project: Highway 100
Location: Highway 100
Date: 10/10/10

Applicant: Highway 100
Project: Highway 100
Date: 10/10/10

Project: Highway 100

Date: 10/10/10

EXPLANATION OF SYMBOLS

APPENDIX A

**Boring Logs for
MW-5M, 6M, 9, 10 and 11M**

1. Description of Boring Log: This log was obtained from the boring log book, and is a copy of the original log.

2. Description of Boring Log: This log was obtained from the boring log book, and is a copy of the original log.



Apenaki
Geoenvironmental, Inc.
P.O. Box 1018 • Lewistown, Montana 59547 • (406) 538-5800

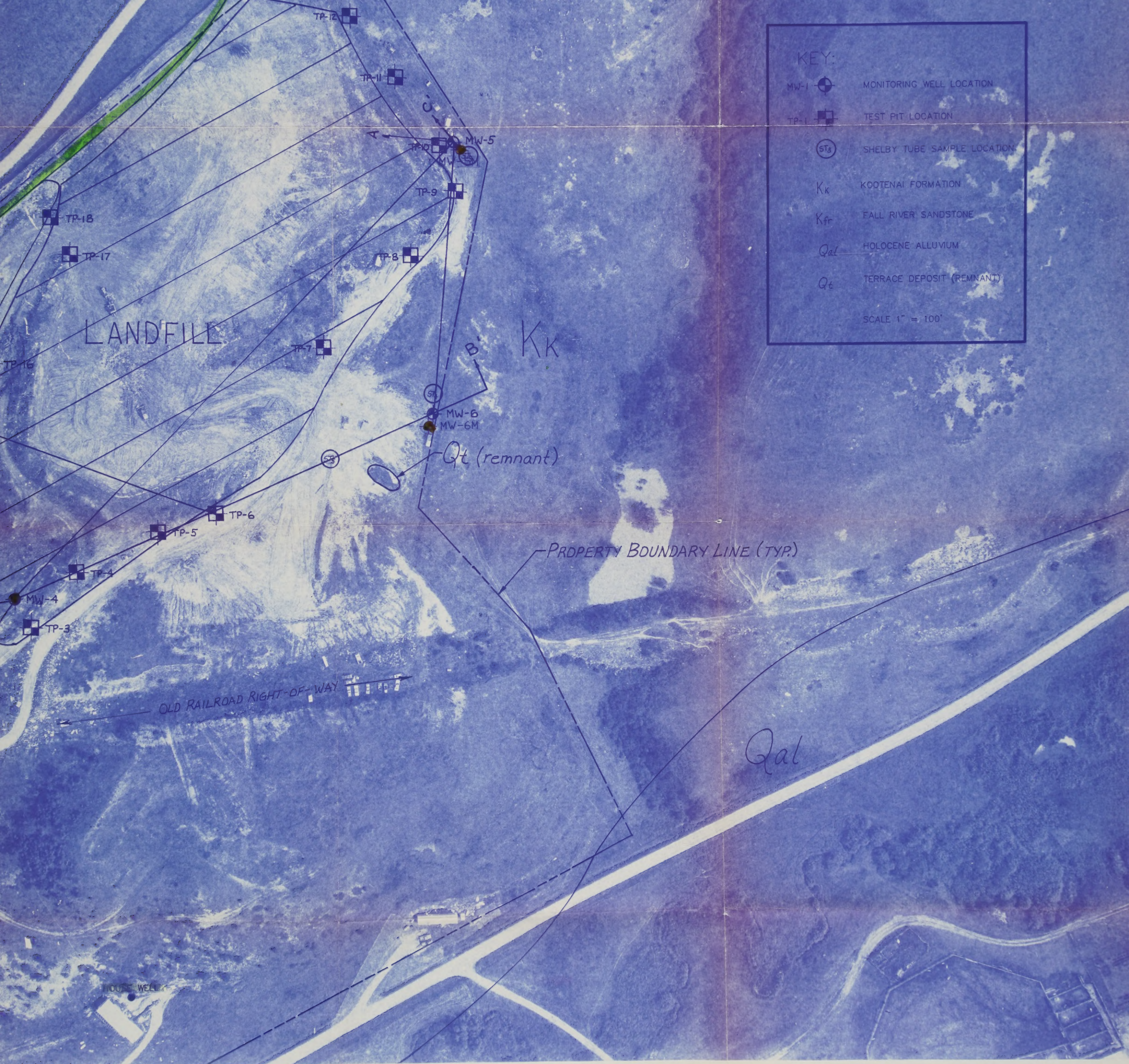
GEOHYDROLOGIC SITE CHARACTERIZATION
MISTER M LANDFILL
LEWISTOWN, MONTANA

SITE PLAN — Test Pit and Boring Locations; Surficial Geology

PROJECT NO. 579-03 NOVEMBER 1993

FIGURE 2

REVISED: 11/94 Added MW-9, MW-10, MW-5M, MW-6M, MW-11M, OFFICE WELL, HOUSE WELL.



KEY:

- MW-1  MONITORING WELL LOCATION
- TP-1  TEST PIT LOCATION
- STs  SHELBY TUBE SAMPLE LOCATION
- Kk KOOTENAI FORMATION
- Kfr FALL RIVER SANDSTONE
- Qal HOLOCENE ALLUVIUM
- Qt TERRACE DEPOSIT (REMNANT)

SCALE 1" = 100'

Project: Highway 100
 Location: Highway 100
 Date: 10/11/94

Applicant: [illegible]
 Street Name: [illegible]
 Date: 10/11/94

Project No. [illegible]

Page No. 1 of 1

DESCRIPTION OF MATERIAL

APPENDIX A

**Boring Logs for
 MW-5M, 6M, 9, 10 and 11M**

Location: [illegible]
 Date: [illegible]

Notes: [illegible]

figure A-1 & 2

AT Rest 95-09

Part
~~Rest~~ 2

APPENDIX A

Boring Logs for MW-5M, 6M, 9, 10 and 11M

TEST BORING LOG MW-5M

Project: Mister M Landfill
Location: Lewistown, Montana
Client: Mister M, Inc.

Approximate Surface Elevation: 4264.3
Ground Water Depth: NFGWE
Date: 10-14 & 18/-94

Project No. 579-03

Sheet No. 1 of 14

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE #	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT, %	LAB TESTS
0				SANDSTONE; Weakly cemented to moderately hard, silty, tan to tan-gray.					
5									
10									
15									
20									
25									
30				SILTSTONE; Soft, dry, some plasticity, hard fragments, gray-tan.					

TEST BORING LOG MW-5M

Project: Mister M Landfill
Location: Lewistown, Montana
Client: Mister M, Inc.

Approximate Surface Elevation: 4264.3
Ground Water Depth: NFGWE
Date: 10-14 & 18/-94

Project No. 579-03

Sheet No. 2 of 14

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE #	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT, %	LAB TESTS
35									
				SHALE; Soft, dry, plastic, thin, hard, gray zones below 46 feet, red-maroon.					
40									
45									
50									
55				SANDSTONE; Hard, dry, fine, silty, becoming shaley below 57 feet, gray to gray-tan.					
60				SHALEY SANDSTONE; Hard, dry to damp, fine, some plasticity, more sandy with depth, gray to gray-brown with red-maroon.					
65									

TEST BORING LOG MW-5M

Project: Mister M Landfill
 Location: Lewistown, Montana
 Client: Mister M, Inc.

Approximate Surface Elevation: 4264.3
 Ground Water Depth: NFGWE
 Date: 10-14 & 18/-94

Project No. 579-03

Sheet No. 3 of 14

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE #	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT, %	LAB TESTS
70									
75									
80				SHALE; Soft, dry, plastic, red-maroon. Bottom of Exploration at 80 feet.					
85									
90									
95									
100									

Robert W. Gillespie, P.E.
 Lewistown, Montana

TEST BORING LOG MW-6M

Project: Mister M Landfill
 Location: Lewistown, Montana
 Client: Mister M, Inc.

Approximate Surface Elevation: 4257.6
 Ground Water Depth: NFGWE
 Date: 10-15-94

Project No. 579-03

Sheet No. 4 of 14

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE #	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT, %	LAB TESTS
0				SANDSTONE; Hard, dry, fine to very fine, grading to siltstone in zones, tan to tan-gray.					
5									
10									
15									
20									
25				SHALE; Soft, dry, plastic, red-brown.					
30				SANDSTONE/SILTSTONE; Moderately hard, dry, fine to very fine, tan-gray.					
				SHALE; Soft, dry, plastic, red-brown.					

TEST BORING LOG MW-6M

Project: Mister M Landfill
Location: Lewistown, Montana
Client: Mister M, Inc.

Approximate Surface Elevation: 4257.6
Ground Water Depth: NFGWE
Date: 10-15-94

Project No. 579-03

Sheet No. 5 of 14

DEPTH, FT.		SAMPLE #	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT, %	LAB TESTS
35								
40								
45			SANDSTONE; Hard, dry, fine, silty, grading to siltstone. SHALE; Soft, dry, plastic, red-brown.					
50								
55								
60								
65								

Robert W. Gillespie, P.E.
Lewistown, Montana

TEST BORING LOG MW-6M

Project: Mister M Landfill
Location: Lewistown, Montana
Client: Mister M, Inc.

Approximate Surface Elevation: 4257.6
Ground Water Depth: NFGWE
Date: 10-15-94

Project No. 579-03

Sheet No. 6 of 14

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE #	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT, %	LAB TESTS
70									
75									
80				SANDSTONE; Hard, dry, fine to very fine, silty, limestone(?) lenses, gray.					
				Bottom of Exploration at 82 feet.					
85									
90									
95									
100									

TEST BORING LOG MW-9

Project: Mister M Landfill
Location: Lewistown, Montana
Client: Mister M, Inc.

Approximate Surface Elevation: 4176.8
Ground Water Depth: NFGWE
Date: 10-14-94

Project No. 579-03

Sheet No. 7 of 14

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE #	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT, %	LAB TESTS
0				CLAY (CH); Very stiff to hard, damp, highly plastic, occasional shale fragments, dark reddish-brown (weathered shale).					
5									
10									
15				SILTSTONE; Weakly cemented, fine, some plasticity when moistened, dry, hard seams, tan-gray.					
20				SHALE; Soft, damp, hard seams, plastic, maroon.					
25				SILTSTONE; Weakly cemented, dry, fine to very fine, thin (<2mm) bentonite seams, becoming hard below 27 feet, tan-gray to gray.					
30									

TEST BORING LOG MW-9

Project: Mister M Landfill
Location: Lewistown, Montana
Client: Mister M, Inc.

Approximate Surface Elevation: 4176.8
Ground Water Depth: NFGWE
Date: 10-14-94

Project No. 579-03

Sheet No. 8 of 14

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE #	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT, %	LAB TESTS
35									
40				SANDSTONE; Poorly indurated, dry, fine, silty to occasionally clayey, becoming sandy siltstone below 40 feet, tan-gray.					
45				SHALE; Soft with hard zones, damp, plastic, thin bentonite seams, maroon.					
50									
55									
60									
65				Bottom of Exploration at 62 feet.					

Robert W. Gillespie, P.E.
Lewistown, Montana

TEST BORING LOG MW-10

Project: Mister M Landfill
Location: Lewistown, Montana
Client: Mister M, Inc.

Approximate Surface Elevation: 4193.3
Ground Water Depth: 40'
Date: 10-14-94

Project No. 579-03

Sheet No. 9 of 14

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE #	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT, %	LAB TESTS
0				FILL; Weathered shale, stiff, damp, some hard fragments, red-brown.					
5									
10									
15				SHALE; Soft, damp, plastic, hard fragments, red-brown with gray streaks.					
20									
25				BENTONITE; Soft, damp, highly plastic, shale seams below 37 feet, gray to maroon-gray.					
30									

TEST BORING LOG MW-10

Project: Mister M Landfill
Location: Lewistown, Montana
Client: Mister M, Inc.

Approximate Surface Elevation: 4193.3
Ground Water Depth: 40'
Date: 10-14-94

Project No. 579-03

Sheet No. 10 of 14

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE #	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT, %	LAB TESTS
35	+								
36	+								
37	+								
38	+								
39	+								
40	+								
41	+								
42	+								
43	+								
44	+								
45	+			SHALE; Soft, damp, plastic, hard fragments, red-brown with gray streaks.					
46	+								
47	+								
48	+								
49	+								
50	+								
51	+								
52	+								
53	+								
54	+								
55	+			SANDSTONE; Moderately hard, very fine, silty, tan-gray, trace to little free water.					
56	+								
57	+			SHALE; Soft, damp, plastic, hard fragments, red-brown with gray streaks.					
58	+								
59	+								
60	+								
61	+			Bottom of Exploration at 61 feet.					
62	+								
63	+								
64	+								
65	+								

TEST BORING LOG MW-11M

Project: Mister M Landfill
Location: Lewistown, Montana
Client: Mister M, Inc.

Approximate Surface Elevation: 4263.3
Ground Water Depth: NFGWE
Date: 10-26-94

Project No. 579-03

Sheet No. 11 of 14

DEPTH, FT.	SYMBOL SAMPLES	SAMPLE #	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT, %	LAB TESTS
0			SANDY SILTSTONE/SILTY SANDSTONE; Soft to moderately hard, dry, fine, some plasticity, tan-gray to light brown.					
5								
10								
15								
20								
25								
30			SHALE; Soft, bentonitic(?), dry to damp, gray and light gray.					

TEST BORING LOG MW-11M

Project: Mister M Landfill
Location: Lewistown, Montana
Client: Mister M, Inc.

Approximate Surface Elevation: 4263.3
Ground Water Depth: NFGWE
Date: 10-26-94

Project No. 579-03

Sheet No. 12 of 14

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE #	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT, %	LAB TESTS
35				SHALE; Soft, dry, plastic, hard fragments, red-maroon to dark red-gray.					
40									
45									
50				SHALE; Soft, bentonitic(?) dry to damp, dark gray to light gray.					
55									
60				SHALE; Soft, dry, plastic, hard fragments, red-brown.					
65				SHALEY SANDSTONE; Soft, damp, fine, some plasticity, red-brown.					

TEST BORING LOG MW-11M

Project: Mister M Landfill
Location: Lewistown, Montana
Client: Mister M, Inc.

Approximate Surface Elevation: 4263.3
Ground Water Depth: NFGWE
Date: 10-26-94

Project No. 579-03

Sheet No. 13 of 14

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE #	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT, %	LAB TESTS
70									
75									
80				SHALE; Soft, dry to damp, sandy zones between 82 and 86 feet, becoming harder with depth, light red to red-maroon.					
85									
90									
95									
100									

TEST BORING LOG MW-11M

Project: Mister M Landfill
Location: Lewistown, Montana
Client: Mister M, Inc.

Approximate Surface Elevation: 4263.3
Ground Water Depth: NFGWE
Date: 10-26-94

Project No. 579-03

Sheet No. 14 of 14

[illegible]

Robert W. Gillespie, P.E.
Lewistown, Montana

GROUND WATER OBSERVATION WELL COMPLETION PROFILE

WELL NO. 1A

OBSERVED WATER SURFACE ELEVATION 475.2

DATE 10-16-74

DISTANCE BELOW GROUND

APPENDIX B

Completion Forms for MW-5, 6M, 9, 10 and 11M

LOG

CASING 4" x 1/2"

TOP OF P.V.C. 435.25

SCREEN 435.25

CAY BARRIER

CASING TYPE Steel

INSIDE DIAMETER 2 in.

TOP OF REMOVABLE SEAL 435.25

TOP OF SAND 435.25

TOP OF SCREEN 435.25

TYPE/SIZE OF SAND 1/4" x 1/2"

TYPE OF POINT Point

SIZE OF OPENING 1/4"

INSIDE DIAMETER 2 in.

BOTTOM OF SCREEN 435.25

Robert W. O'Leary, P.E.

PROJECT Highway 9 Interchange

PROJ. DIST. NO. 572-10

LOCATION Lees Ferry, AZ

DRAWING DATE 10-19-74

COMPLETION DATE 10-16-74

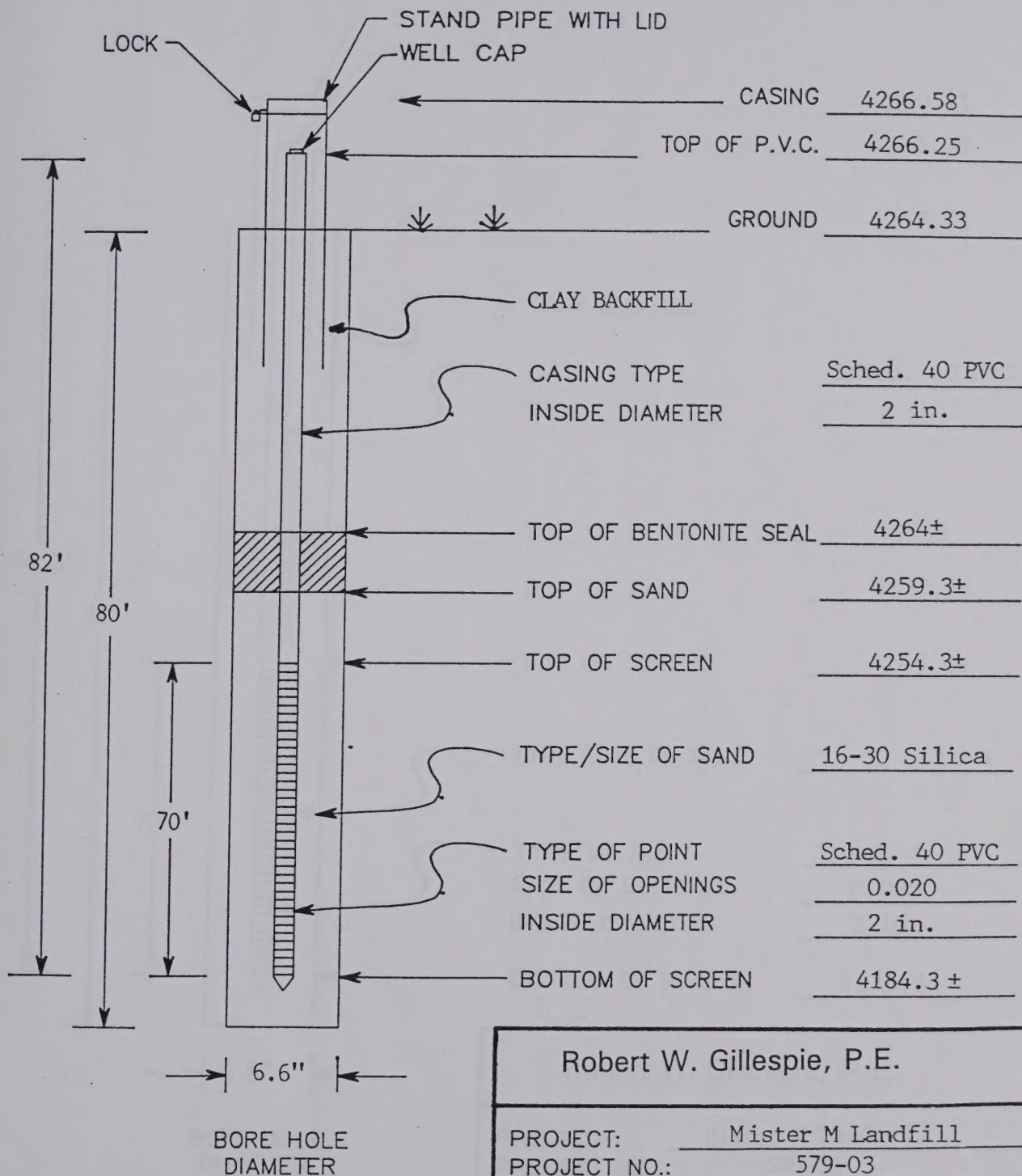
GROUND WATER OBSERVATION WELL COMPLETION PROFILE

WELL NO.: 5M

OBSERVED WATER SURFACE ELEVATION: NFGWE

DATE: 10-19-94

DISTANCE BELOW GROUND:



Robert W. Gillespie, P.E.

PROJECT: Mister M Landfill

PROJECT NO.: 579-03

LOCATION: Lewistown, MT

DRILLING DATE: 10-19-94

COMPLETION DATE: 10-19-94

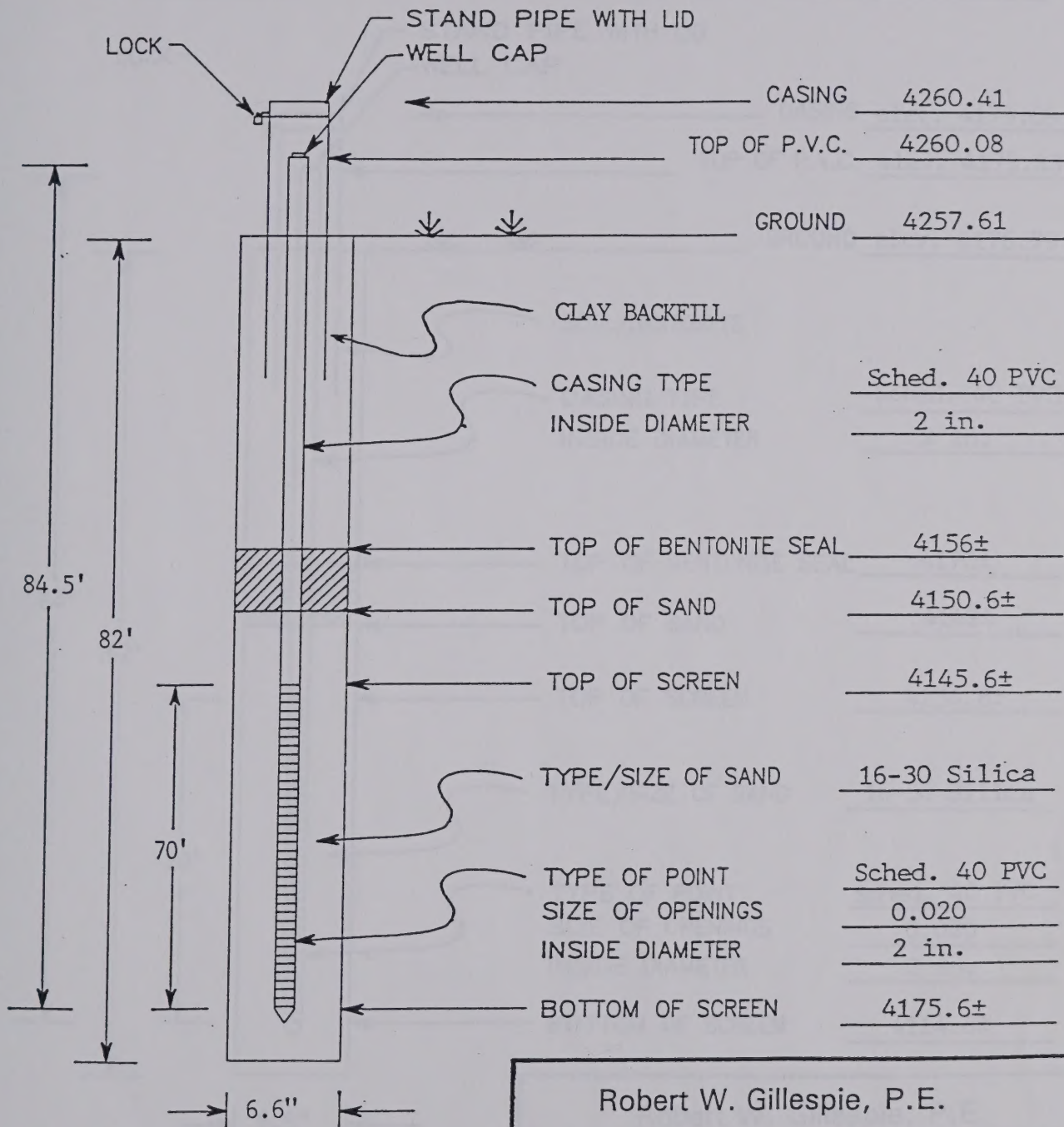
GROUND WATER OBSERVATION WELL COMPLETION PROFILE

WELL NO.: 6M

OBSERVED WATER SURFACE ELEVATION: NFGWE

DATE: 10-18-94

DISTANCE BELOW GROUND:



Robert W. Gillespie, P.E.

PROJECT: Mister M Landfill

PROJECT NO.: 579-03

LOCATION: Lewistown, MT

DRILLING DATE: 10-14 & 18/-94

COMPLETION DATE: 10-18-94

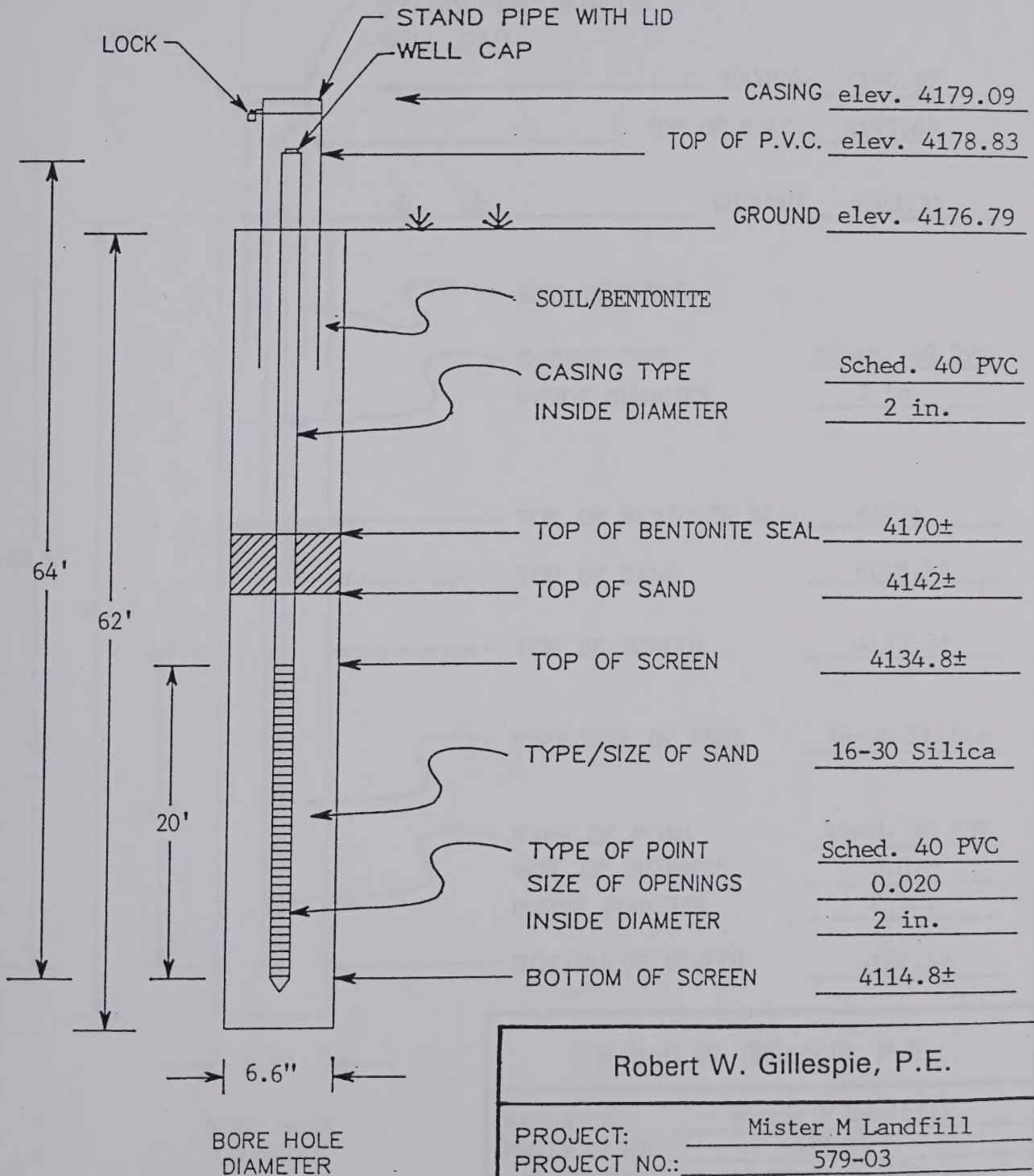
GROUND WATER OBSERVATION WELL COMPLETION PROFILE

WELL NO.: 9

OBSERVED WATER SURFACE ELEVATION: NFGWE

DATE: 10-14-94

DISTANCE BELOW GROUND:



Robert W. Gillespie, P.E.

PROJECT: Mister M Landfill

PROJECT NO.: 579-03

LOCATION: Lewistown, MT

DRILLING DATE: 10-14-94

COMPLETION DATE: 10-14-94

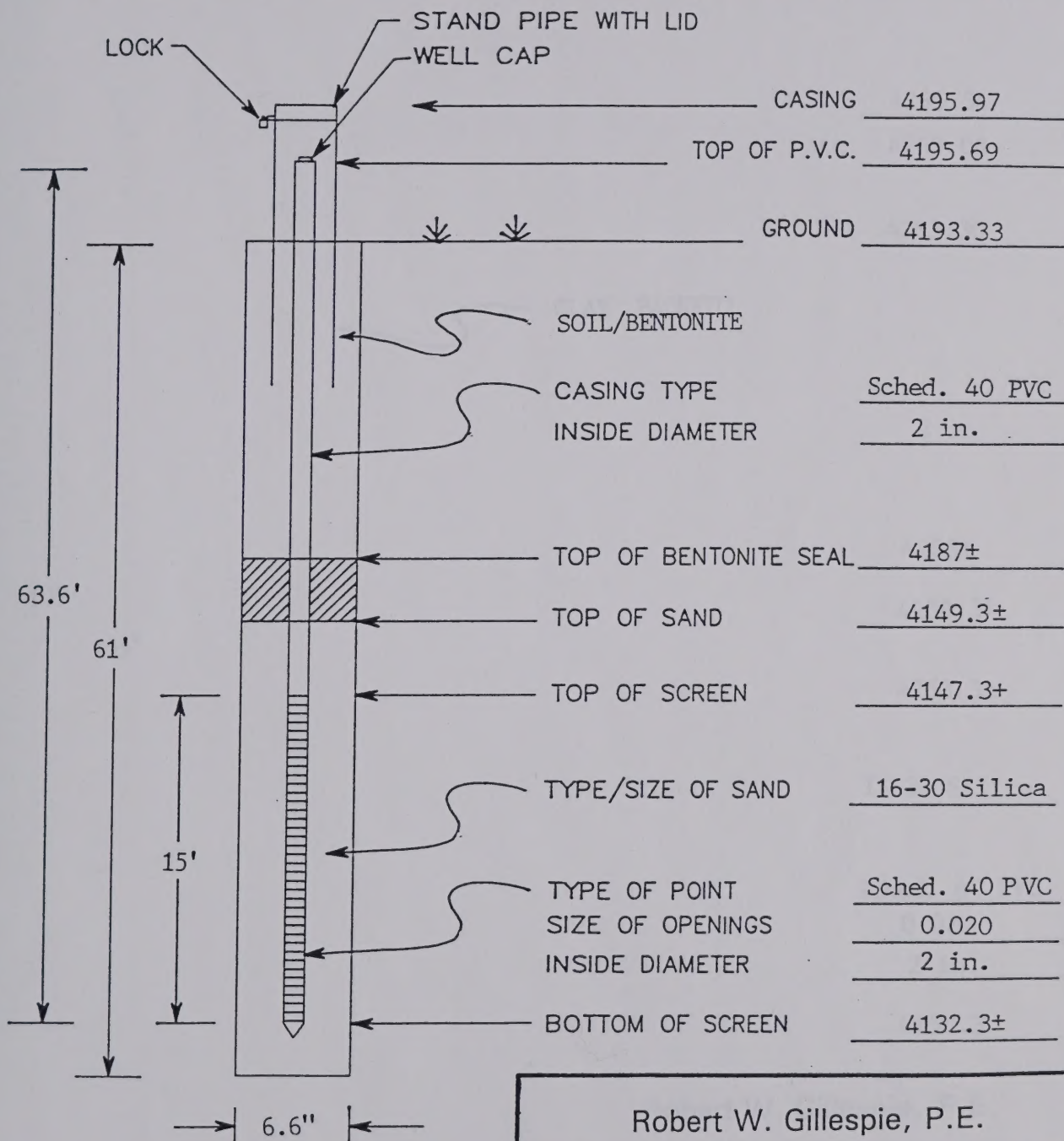
GROUND WATER OBSERVATION WELL COMPLETION PROFILE

WELL NO.: 10

OBSERVED WATER SURFACE ELEVATION: 4153±

DATE: 10-14-94

DISTANCE BELOW GROUND: 40 ft.



Robert W. Gillespie, P.E.

PROJECT: Mister M Landfill

PROJECT NO.: 579-03

LOCATION: Lewistown, MT

DRILLING DATE: 10-14-94

COMPLETION DATE: 10-14-94

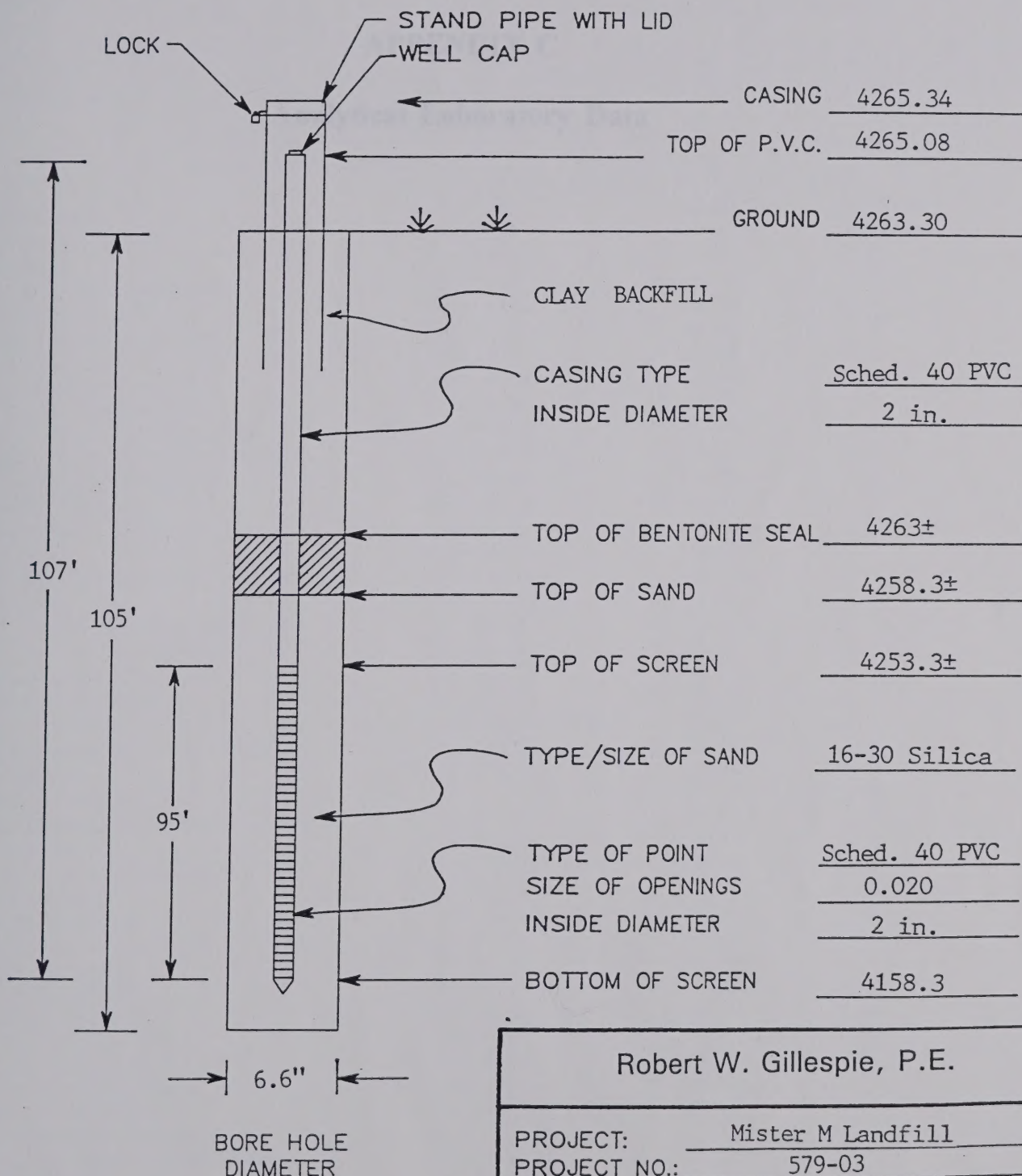
GROUND WATER OBSERVATION WELL COMPLETION PROFILE

WELL NO.: 11M

OBSERVED WATER SURFACE ELEVATION: NFGWE

DATE: 10-26-94

DISTANCE BELOW GROUND:



Robert W. Gillespie, P.E.

PROJECT: Mister M Landfill

PROJECT NO.: 579-03

LOCATION: Lewistown, MT

DRILLING DATE: 10-26-94

COMPLETION DATE: 10-26-94

Analytical Laboratory Data



ENERGY LABORATORIES, INC.

P.O. BOX 30916 • 1107 SOUTH BROADWAY • BILLINGS, MT 59107-0916 • PHONE (406) 252-6325
FAX (406) 252-6069 • 1-800-735-4499

Client: Mister M Disposal
 Date Sampled: 29-DEC-94 09:35
 Date Received: 29-DEC-94
 Analysis Date: 29-DEC-1994 15:00
 File: /chem/5971A.1/val22994.b/29dec1101011.d
 Project Info:
 Sample Info: MW 10

Lab No.: 94-61902
 Report Date: 12/30/94
 Extraction Method: EPA 5030
 Sample Matrix: WATER

EPA METHOD 624
 VOLATILE ORGANICS ANALYSIS REPORT

CONCENTRATION UNITS = ug/L (ppb)

COMPOUNDS	CAS NO.	RESULT	QUALIFIER
=====	=====	=====	=====
Benzene	71-43-2	<0.50	U
Carbon tetrachloride	56-23-5	<0.50	U
Chlorobenzene	108-90-7	<0.50	U
1,2-Dichlorobenzene	95-50-1	<0.50	U
1,4-Dichlorobenzene	106-46-7	<0.50	U
1,2-Dichloroethane	107-06-2	<0.50	U
1,1-Dichloroethene	75-35-4	<0.50	U
cis-1,2-Dichloroethene	156-59-2	<0.50	U
trans-1,2-Dichloroethene	156-60-5	<0.50	U
1,2-Dichloropropane	78-87-5	<0.50	U
Ethyl benzene	100-41-4	<0.50	U
Methylene chloride	75-09-2	<0.50	U
Styrene	100-42-5	<0.50	U
Tetrachloroethene	127-18-4	<0.50	U
Toluene	108-88-3	<0.50	U
1,1,1-Trichloroethane	71-55-6	<0.50	U
1,1,2-Trichloroethane	79-00-5	<0.50	U
Trichloroethene	79-01-6	<0.50	U
Vinyl chloride	75-01-4	<0.50	U
m+p-Xylenes	108383/106423	<0.50	U
2-Chloroethylvinyl ether	110-75-8	<0.50	U
o-Xylene	95-47-6	<0.50	U
Total Xylenes		<0.50	U
Bromodichloromethane	75-27-4	<0.50	U
Bromoform	75-25-2	<0.50	U
Chlorodibromomethane	124-48-1	<0.50	U
Chloroform	67-66-3	<0.50	U
Bromobenzene	108-86-1	<0.50	U
Bromochloromethane	74-97-5	<0.50	U
Bromomethane	74-83-9	<0.50	U
Chloroethane	75-00-3	<0.50	U
Chloromethane	74-87-3	<0.50	U
2-Chlorotoluene	95-49-8	<0.50	U
4-Chlorotoluene	106-43-4	<0.50	U
1,2-Dibromoethane	106-93-4	<0.50	U
Dibromomethane	74-95-3	<0.50	U
1,3-Dichlorobenzene	541-73-1	<0.50	U
Dichlorodifluoromethane	75-71-8	<0.50	U
1,1-Dichloroethane	75-34-3	<0.50	U
1,1-Dichloropropene	563-58-6	<0.50	U
1,3-Dichloropropane	142-28-9	<0.50	U

(report continued on page 2)

Lab No.: 94-61902
Sample Info: MW 10

Page 2

EPA METHOD 624
VOLATILE ORGANICS ANALYSIS REPORT (continued)

=====

COMPOUNDS	CAS NO.	CONCENTRATION UNITS = ug/L (ppb)	RESULT	QUALIFIER
=====	=====	=====	=====	=====
cis-1,3-Dichloropropene	10061-01-5		<0.50	U
trans-1,3-Dichloropropene	10061-02-6		<0.50	U
2,2-Dichloropropane	594-20-7		<0.50	U
Fluorotrichloromethane	75-69-4		<0.50	U
1,1,1,2-Tetrachloroethane	630-20-6		<0.50	U
1,1,2,2-Tetrachloroethane	79-34-5		<0.50	U
1,2,3-Trichloropropane	96-18-4		<0.50	U

SURROGATE RECOVERY REPORT

Surrogate Compound	Added ug/L	Measured ug/L	%Rec	QC Limits
=====	=====	=====	=====	=====
1,2-Dichloroethane d4	10.0	9.58	96	80--120
Toluene d8	10.0	9.87	99	80--120
p-Bromofluorobenzene	10.0	9.57	96	80--120

QUALIFIER CODES EXPLANATION:

U= Indicates compound was analyzed for but not detected.

REPORT COMMENTS: None

Analyst: CHW Reviewing Supervisor: WJB



ENERGY LABORATORIES, INC.

P.O. BOX 30916 • 1107 SOUTH BROADWAY • BILLINGS, MT 59107-0916 • PHONE (406) 252-6322
FAX (406) 252-6069 • 1-800-735-4488

Client: Mister M Disposal
 Date Sampled: 29-DEC-94 10:40
 Date Received: 29-DEC-94
 Analysis Date: 29-DEC-1994 15:48
 File: /chem/5971A.1/val22994.b/29dec1201012.d
 Project Info:
 Sample Info: Office Well

Lab No.: 94-61903
 Report Date: 12/30/94
 Extraction Method: EPA 5030
 Sample Matrix: WATER

EPA METHOD 624
 VOLATILE ORGANICS ANALYSIS REPORT

CONCENTRATION UNITS = ug/L (ppb)			
COMPOUNDS	CAS NO.	RESULT	QUALIFIER
=====	=====	=====	=====
Benzene	71-43-2	<0.50	U
Carbon tetrachloride	56-23-5	<0.50	U
Chlorobenzene	108-90-7	<0.50	U
1,2-Dichlorobenzene	95-50-1	<0.50	U
1,4-Dichlorobenzene	106-46-7	<0.50	U
1,2-Dichloroethane	107-06-2	<0.50	U
1,1-Dichloroethene	75-35-4	<0.50	U
cis-1,2-Dichloroethene	156-59-2	0.73	
trans-1,2-Dichloroethene	156-60-5	<0.50	U
1,2-Dichloropropane	78-87-5	<0.50	U
Ethyl benzene	100-41-4	<0.50	U
Methylene chloride	75-09-2	<0.50	U
Styrene	100-42-5	<0.50	U
Tetrachloroethene	127-18-4	<0.50	U
Toluene	108-88-3	<0.50	U
1,1,1-Trichloroethane	71-55-6	<0.50	U
1,1,2-Trichloroethane	79-00-5	<0.50	U
Trichloroethene	79-01-6	<0.50	U
Vinyl chloride	75-01-4	<0.50	U
m-p-Xylenes	108383/106423	<0.50	U
2-Chloroethylvinyl ether	110-75-8	<0.50	U
o-Xylene	95-47-6	<0.50	U
Total Xylenes		<0.50	U
Bromodichloromethane	75-27-4	<0.50	U
Bromoform	75-25-2	<0.50	U
Chlorodibromomethane	124-48-1	<0.50	U
Chloroform	67-66-3	<0.50	U
Bromobenzene	108-86-1	<0.50	U
Bromochloromethane	74-97-5	<0.50	U
Bromomethane	74-83-9	<0.50	U
Chloroethane	75-00-3	<0.50	U
Chloromethane	74-87-3	<0.50	U
2-Chlorotoluene	95-49-8	<0.50	U
4-Chlorotoluene	106-43-4	<0.50	U
1,2-Dibromoethane	106-93-4	<0.50	U
Dibromomethane	74-95-3	<0.50	U
1,3-Dichlorobenzene	541-73-1	<0.50	U
Dichlorodifluoromethane	75-71-8	<0.50	U
1,1-Dichloroethane	75-34-3	<0.50	U
1,1-Dichloropropene	563-58-6	<0.50	U
1,3-Dichloropropane	142-28-9	<0.50	U

(report continued on page 2)

Lab No.: 94-61903

Page 2

Sample Info: Office Well

EPA METHOD 624
VOLATILE ORGANICS ANALYSIS REPORT (continued)

=====

CONCENTRATION UNITS = ug/L (ppb)			
COMPOUNDS	CAS NO.	RESULT	QUALIFIER
=====	=====	=====	=====
cis-1,3-Dichloropropene	10061-01-5	<0.50	U
trans-1,3-Dichloropropene	10061-02-6	<0.50	U
2,2-Dichloropropane	594-20-7	<0.50	U
Fluorotrichloromethane	75-69-4	<0.50	U
1,1,1,2-Tetrachloroethane	630-20-6	<0.50	U
1,1,2,2-Tetrachloroethane	79-34-5	<0.50	U
1,2,3-Trichloropropane	96-18-4	<0.50	U

SURROGATE RECOVERY REPORT

Surrogate Compound	Added ug/L	Measured ug/L	%Rec	QC Limits
=====	=====	=====	=====	=====
1,2-Dichloroethane d4	10.0	9.76	98	80--120
Toluene d8	10.0	10.0	100	80--120
p-Bromofluorobenzene	10.0	9.44	94	80--120

QUALIFIER CODES EXPLANATION:

U= Indicates compound was analyzed for but not detected.

REPORT COMMENTS: None

Analyst CNA Reviewing Supervisor: WJN



ENERGY LABORATORIES, INC.

P.O. BOX 30918 • 1107 SOUTH BROADWAY • BILLINGS, MT 59107-0918 • PHONE (406) 252-6325
FAX (406) 252-6089 • 1-800-735-4480

Client: Mister M Disposal

Date Sampled:

Date Received: 29-DEC-94

Analysis Date: 29-DEC-1994 16:25

File: /chem/5971A.1/val22994.b/29dec1301013.d

Project Info:

Sample Info: Trip Blank

Lab No.: 94-61904

Report Date: 12/30/94

Extraction Method: EPA 5030

Sample Matrix: WATER

EPA METHOD 624
VOLATILE ORGANICS ANALYSIS REPORT

=====

CONCENTRATION UNITS = ug/L (ppb)

COMPOUNDS	CAS NO.	RESULT	QUALIFIER
=====	=====	=====	=====
Benzene	71-43-2	<0.50	U
Carbon tetrachloride	56-23-5	<0.50	U
Chlorobenzene	108-90-7	<0.50	U
1,2-Dichlorobenzene	95-50-1	<0.50	U
1,4-Dichlorobenzene	106-46-7	<0.50	U
1,2-Dichloroethane	107-06-2	<0.50	U
1,1-Dichloroethene	75-35-4	<0.50	U
cis-1,2-Dichloroethene	156-59-2	<0.50	U
trans-1,2-Dichloroethene	156-60-5	<0.50	U
1,2-Dichloropropane	78-87-5	<0.50	U
Ethyl benzene	100-41-4	<0.50	U
Methylene chloride	75-09-2	<0.50	U
Styrene	100-42-5	<0.50	U
Tetrachloroethene	127-18-4	<0.50	U
Toluene	108-88-3	<0.50	U
1,1,1-Trichloroethane	71-55-6	<0.50	U
1,1,2-Trichloroethane	79-00-5	<0.50	U
Trichloroethene	79-01-6	<0.50	U
Vinyl chloride	75-01-4	<0.50	U
m+p-Xylenes	108383/106423	<0.50	U
2-Chloroethylvinyl ether	110-75-8	<0.50	U
o-Xylene	95-47-6	<0.50	U
Total Xylenes		<0.50	U
Bromodichloromethane	75-27-4	<0.50	U
Bromoform	75-25-2	<0.50	U
Chlorodibromomethane	124-48-1	<0.50	U
Chloroform	67-66-3	<0.50	U
Bromobenzene	108-86-1	<0.50	U
Bromochloromethane	74-97-5	<0.50	U
Bromomethane	74-83-9	<0.50	U
Chloroethane	75-00-3	<0.50	U
Chloromethane	74-87-3	<0.50	U
2-Chlorotoluene	95-49-8	<0.50	U
4-Chlorotoluene	106-43-4	<0.50	U
1,2-Dibromoethane	106-93-4	<0.50	U
Dibromomethane	74-95-3	<0.50	U
1,3-Dichlorobenzene	541-73-1	<0.50	U
Dichlorodifluoromethane	75-71-8	<0.50	U
1,1-Dichloroethane	75-34-3	<0.50	U
1,1-Dichloropropene	563-58-6	<0.50	U
1,3-Dichloropropane	142-28-9	<0.50	U

(report continued on page 2)

Lab No.: 94-61904

Page 2

Sample Info: Trip Blank

EPA METHOD 624
VOLATILE ORGANICS ANALYSIS REPORT (continued)

=====

CONCENTRATION UNITS = ug/L (ppb)			
COMPOUNDS	CAS NO.	RESULT	QUALIFIER
=====	=====	=====	=====
cis-1,3-Dichloropropene	10061-01-5	<0.50	U
trans-1,3-Dichloropropene	10061-02-6	<0.50	U
2,2-Dichloropropane	594-20-7	<0.50	U
Fluorotrichloromethane	75-69-4	<0.50	U
1,1,1,2-Tetrachloroethane	630-20-6	<0.50	U
1,1,2,2-Tetrachloroethane	79-34-5	<0.50	U
1,2,3-Trichloropropane	96-18-4	<0.50	U

----- SURROGATE RECOVERY REPORT -----

Surrogate Compound	Added ug/L	Measured ug/L	%Rec	QC Limits
=====	=====	=====	=====	=====
1,2-Dichloroethane d4	10.0	10.5	105	80--120
Toluene d8	10.0	10.0	100	80--120
p-Bromofluorobenzene	10.0	9.48	95	80--120

QUALIFIER CODES EXPLANATION:

U= Indicates compound was analyzed for but not detected.

REPORT COMMENTS: None

Analyst: C HU Reviewing Supervisor: WTB

EPA METHOD 624 BLANK SPIKE REPORT

=====

Quality Control Sample: Certified Reference Sample Analysis 29-DEC-1994 09:54

Report Date: 12/30/94

Extraction Method: EPA 5030

Sample Matrix: WATER

File: /chem/5971A.i/val22994.b/29dec0301003.d

Remarks: This certified reference sample was spiked into a blank sample matrix then extracted and analyzed with your set of samples to determine if the methodology is in control and to monitor the laboratory's ability to produce accurate results.

CONCENTRATION UNITS = ug/L (ppb)

Spike Compound	Added	Measured	%Rec	QC Limits
=====	=====	=====	=====	=====
Carbon tetrachloride	5.00	4.75	95	60--140
Chlorobenzene	5.00	5.11	102	60--140
1,4-Dichlorobenzene	5.00	4.98	100	60--140
1,2-Dichloroethane	5.00	4.70	94	60--140
1,1-Dichloroethene	5.00	4.45	89	60--140
trans-1,2-Dichloroethene	5.00	4.84	97	60--140
1,2-Dichloropropane	5.00	4.84	97	60--140
Ethyl benzene	5.00	5.70	114	60--140
Tetrachloroethene	5.00	5.10	102	60--140
1,1,2-Trichloroethane	5.00	4.89	98	60--140
1,3-Dichlorobenzene	5.00	5.04	101	60--140

----- SURROGATE RECOVERY REPORT -----

Surrogate Compound	Added ug/L	Measured ug/L	%Rec	QC Limits
=====	=====	=====	=====	=====
1,2-Dichloroethane d4	10.0	10.5	105	80--120
Toluene d8	10.0	10.1	101	80--120
p-Bromofluorobenzene	10.0	9.41	94	80--120

REPORT COMMENTS: None

Analyst: CHN Reviewing Supervisor: WBN

Quality Control Sample: Laboratory Reagent Blank 29-DEC-1994 14:23

Report Date: 12/30/94

Extraction Method: EPA 5030

Sample Matrix: WATER

File: /cham/5971A.i/val22994.b/29dec1001010.d

Remarks: This Laboratory Reagent Blank Quality Control Sample was extracted and analyzed with your set of samples to determine if method analytes or other interferences are present in the laboratory environment, the reagents, or the apparatus.

**EPA METHOD 624
VOLATILE ORGANICS ANALYSIS REPORT**

=====

COMPOUNDS	CAS NO.	CONCENTRATION UNITS = ug/L (ppb)	RESULT	QUALIFIER
=====	=====		=====	=====
Benzene	71-43-2		<0.50	U
Carbon tetrachloride	56-23-5		<0.50	U
Chlorobenzene	108-90-7		<0.50	U
1,2-Dichlorobenzene	95-50-1		<0.50	U
1,4-Dichlorobenzene	106-46-7		<0.50	U
1,2-Dichloroethane	107-06-2		<0.50	U
1,1-Dichloroethene	75-35-4		<0.50	U
cis-1,2-Dichloroethene	156-59-2		<0.50	U
trans-1,2-Dichloroethene	156-60-5		<0.50	U
1,2-Dichloropropane	78-87-5		<0.50	U
Ethyl benzene	100-41-4		<0.50	U
Methylene chloride	75-09-2		<0.50	U
Styrene	100-42-5		<0.50	U
Tetrachloroethane	127-18-4		<0.50	U
Toluene	108-88-3		<0.50	U
1,1,1-Trichloroethane	71-55-6		<0.50	U
1,1,2-Trichloroethane	79-00-5		<0.50	U
Trichloroethene	79-01-6		<0.50	U
Vinyl chloride	75-01-4		<0.50	U
m+p-Xylenes	108383/106423		<0.50	U
2-Chloroethylvinyl ether	110-75-8		<0.50	U
o-Xylene	95-47-6		<0.50	U
Total Xylenes			<0.50	U
Bromodichloromethane	75-27-4		<0.50	U
Bromoform	75-25-2		<0.50	U
Chlorodibromomethane	124-48-1		<0.50	U
Chloroform	67-66-3		<0.50	U
Bromobenzene	108-86-1		<0.50	U
Bromochloromethane	74-97-5		<0.50	U
Bromomethane	74-83-9		<0.50	U
Chloroethane	75-00-3		<0.50	U
Chloromethane	74-87-3		<0.50	U
2-Chlorotoluene	95-49-8		<0.50	U
4-Chlorotoluene	106-43-4		<0.50	U
1,2-Dibromoethane	106-93-4		<0.50	U
Dibromomethane	74-95-3		<0.50	U
1,3-Dichlorobenzene	541-73-1		<0.50	U
Dichlorodifluoromethane	75-71-8		<0.50	U
1,1-Dichloroethane	75-34-3		<0.50	U
1,1-Dichloropropene	563-58-6		<0.50	U
1,3-Dichloropropane	142-28-9		<0.50	U

(report continued on page 2)

Quality Control Sample: Laboratory Reagent Blank 29-DEC-1994 14:23
Report Date: 12/30/94

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EPA METHOD 624
VOLATILE ORGANICS ANALYSIS REPORT (continued)
=====

COMPOUNDS	CAS NO.	CONCENTRATION UNITS = ug/L (ppb)	RESULT	QUALIFIER
=====	=====	=====	=====	=====
cis-1,3-Dichloropropene	10061-01-5		<0.50	U
trans-1,3-Dichloropropene	10061-02-6		<0.50	U
2,2-Dichloropropane	594-20-7		<0.50	U
Fluorotrichloromethane	75-69-4		<0.50	U
1,1,1,2-Tetrachloroethane	630-20-6		<0.50	U
1,1,2,2-Tetrachloroethane	79-34-5		<0.50	U
1,2,3-Trichloropropane	96-18-4		<0.50	U

----- SURROGATE RECOVERY REPORT -----

Surrogate Compound	Added ug/L	Measured ug/L	%Rec	QC Limits
=====	=====	=====	=====	=====
1,2-Dichloroethane d4	10.0	10.5	105	80--120
Toluene d8	10.0	9.96	100	80--120
p-Bromofluorobenzene	10.0	9.45	94	80--120

QUALIFIER CODES EXPLANATION:

U- Indicates compound was analyzed for but not detected.

REPORT COMMENTS: None

Analyst: CHH Reviewing Supervisor: wry

